

09/980990
JC10 RECEIVED PCT/PTO 06 DEC 2001

UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner: Group: Attorney Docket # 1899

Applicant(s) : WENDT, D., ET AL

Serial No. :

Filed :

For : PIEZOELECTRIC ELEMENT WITH A MULTI-LAYER
STRUCTURE OF PIEZOELECTRIC PLIES...

7a
Revised
H. Chappin
3-13-03

SIMULTANEOUS AMENDMENT

December 6, 2001

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

S I R S:

Simultaneously with filing of the above identified application
please amend the same as follows:

In the Claims:

Cancel all claims without prejudice.

Substitute the claims attached hereto.

REMARKS:

This Amendment is submitted simultaneously with filing of the above identified
application.

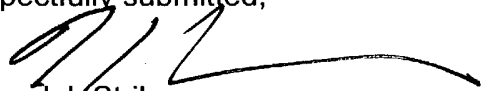
With the present Amendment applicant has amended the claims so as to eliminate
their multiple dependency.

2001 DEC 06 09 09 09

09/980990
JC10 Rec PCT/PTO 06 DEC 2007

Consideration and allowance of the present application is most respectfully requested.

Respectfully submitted,



Michael J. Striker
Attorney for Applicant(s)
Reg. No. 27233

20071206 09:09:09

Claims

- 1
2
3 1. Tool receiver for a grinder, in particular for a handheld angle grinder (10)
4 having a carrier device (12, 14, 16, 182, 184, 300) via which an application tool
5 (18, 32, 186, 188) can be actively connected to a drive shaft (54), characterized
6 in that the application tool (18, 32, 186, 188) can be actively connected to the
7 carrier device (12, 14, 16, 182, 184, 300) via at least one detent element (24, 26,
8 190, 192, 194, 196, 198, 200, 302) that can be moved against a spring force,
9 that snaps into place in an operating position of the application tool (18, 32, 186,
10 188) and immobilizes the application tool (18, 32, 186, 188) with positive
11 engagement.
12
13 2. Tool receiver for a grinder according to claim 1, characterized in that the
14 spring force acts in the axial direction (44).
15
16 3. Tool receiver for a grinder according to claim 1 [or 2], characterized in that
17 a drive torque can be transferred via a positive connection between the
18 application tool (18, 32, 186, 188) and the carrier device (14, 16, 182, 184, 300).
19
20 4. Tool receiver for a grinder according to [one of the preceding claims]
21 claim 1, characterized in that the application tool (186, 188) can be connected to
22 the carrier device (182, 184) via at least one carrier element (202, 204, 206, 208,
23 210, 212) located on the application tool (186, 188) and/or the carrier device
24 (182, 184) extending in the axial direction (38), that it can be guided through at
25 least one area of a slot (214, 216, 218, 220, 222, 224) of the corresponding
26 counter-component (186, 188), moved along the slot (214, 216, 218, 220, 222,
27 224) and immobilized in an end position by means of the detent element (190,
28 192, 194, 196, 198, 200).
29
30 5. Tool receiver for a grinder according to claim 4, characterized in that the
31 application tool (186, 188) can be immobilized with positive engagement in the

1 axial direction (38) via a seating surface (226, 278) of the carrier element (202,
2 204, 206, 208, 210, 212).

3

4 6. Tool receiver for a grinder according to claim 4 [or 5], characterized in that
5 the detent element (190, 192, 194, 196, 198, 200) is formed by an elastically
6 deformable component (228, 230).

7

8 7. Tool receiver for a grinder according to claim 6, characterized in that at
9 least one detent element (190, 192, 194, 196, 198, 200) producing the spring
10 force is designed integrally connected to a tool hub (228, 230) of the application
11 tool (186, 188).

12

13 8. Tool receiver for a grinder according to claim 7, characterized in that at
14 least one recess (236) is provided in a component (234) of the carrier device
15 (184) forming a bearing surface (232) for the application tool (188), into which a
16 part of the tool hub (230) is elastically pressed in an operating position of the
17 application tool (188).

18

19 9. Tool receiver for a grinder according to claim 7 [or 8], characterized in that
20 the slot (214, 216, 218, 220, 222, 224) is provided in the tool hub (228, 230) of
21 the application tool (186, 188), and at least one detent element (190, 192, 194,
22 196, 198, 200) is formed by a part of the tool hub (228, 230) in the vicinity of the
23 slot (214, 216, 218, 220, 222, 224).

24

25 10. Tool receiver for a grinder according to claim 9, characterized in that the
26 slot (220, 222, 224) comprises a wide area (238, 240, 242) and at least one
27 narrow area in front of an end position (250, 252, 254) of the carrier element
28 (208, 210, 212) that forms the detent element (196, 198, 200).

29

30 11. Tool receiver for a grinder according to [one of the preceding claims]

1 claim 1, characterized in that at least one detent element (24, 26, 302) is
2 supported in a fashion that allows it to move against a spring element (20, 22,
3 312).

4
5 12. Tool receiver for a grinder according to claim 11, characterized in that the
6 detent element (24, 26, 302) can be released from its locked position using a
7 release button (28, 30).

8
9 13. Tool receiver for a grinder according to claim 11 [or 12], characterized in
10 that the application tool (18) is connected to the carrier device (12, 14, 300) in the
11 circumferential direction (34, 36) via at least a first element (24, 302) and, in the
12 axial direction (38), via at least a second element (40, 42, 306).

13
14 14. Tool receiver for a grinder according to [one of the preceding claims]
15 claim 1, characterized in that at least one detent element (302) is integrally
16 moulded on a discoid component (304).

17
18 15. Tool receiver for a grinder according to [one of the preceding claims]
19 claim 1, characterized in that at least two elements (306) for immobilizing the
20 application tool in the axial direction (38) are integrally moulded to a discoid
21 component (308).

22
23 16. Tool receiver for a grinder, in particular an angle grinder (10), that can be
24 connected to a tool hub (52, 94, 228, 230) via a carrier device (12, 14, 16, 182,
25 184, 300) of a tool receiver for a grinder with a drive shaft (54) of a grinder (10),
26 characterized in that the tool hub (52, 94, 228, 230) can be effectively connected
27 to the carrier device (12, 14, 16, 182, 184, 300) via at least one detent element
28 (24, 26, 190, 192, 194, 196, 198, 200, 302) that can be moved against a spring
29 force, that snaps into place in an operating position of the tool hub (52, 94, 228,
30 230) and immobilizes the tool hub (52, 94, 228, 230) with positive engagement.

1 17. Tool receiver for a grinder according to claim 16, characterized in that at
2 least one detent element (190, 192, 194, 196, 198, 200) is formed at least
3 partially by the tool hub (228, 230).

5 18. Tool receiver for a grinder according to claim 17, characterized in that at
6 least one slot (220, 222, 224) is provided in the tool hub (230) that comprises a
7 wide area (238, 240, 242) and at least one narrow area forming the detent
8 element (196, 198, 200).

[illegible]

Claims

1

2

3 1. Tool receiver for a grinder, in particular for a handheld angle grinder (10)
4 having a carrier device (12, 14, 16, 182, 184, 300) via which an application tool
5 (18, 32, 186, 188) can be actively connected to a drive shaft (54), characterized
6 in that the application tool (18, 32, 186, 188) can be actively connected to the
7 carrier device (12, 14, 16, 182, 184, 300) via at least one detent element (24, 26,
8 190, 192, 194, 196, 198, 200, 302) that can be moved against a spring force,
9 that snaps into place in an operating position of the application tool (18, 32, 186,
10 188) and immobilizes the application tool (18, 32, 186, 188) with positive
11 engagement.

12

13 2. Tool receiver for a grinder according to claim 1, characterized in that the
14 spring force acts in the axial direction (44).

15

16 3. Tool receiver for a grinder according to claim 1, characterized in that a
17 drive torque can be transferred via a positive connection between the application
18 tool (18, 32, 186, 188) and the carrier device (14, 16, 182, 184, 300).

19

20 4. Tool receiver for a grinder according to claim 1, characterized in that the
21 application tool (186, 188) can be connected to the carrier device (182, 184) via
22 at least one carrier element (202, 204, 206, 208, 210, 212) located on the
23 application tool (186, 188) and/or the carrier device (182, 184) extending in the
24 axial direction (38), that it can be guided through at least one area of a slot (214,
25 216, 218, 220, 222, 224) of the corresponding counter-component (186, 188),
26 moved along the slot (214, 216, 218, 220, 222, 224) and immobilized in an end
27 position by means of the detent element (190, 192, 194, 196, 198, 200).

28

29 5. Tool receiver for a grinder according to claim 4, characterized in that the
30 application tool (186, 188) can be immobilized with positive engagement in the

1 axial direction (38) via a seating surface (226, 278) of the carrier element (202,
2 204, 206, 208, 210, 212).

3

4 6. Tool receiver for a grinder according to claim 4, characterized in that the
5 detent element (190, 192, 194, 196, 198, 200) is formed by an elastically
6 deformable component (228, 230).

7

8 7. Tool receiver for a grinder according to claim 6, characterized in that at
9 least one detent element (190, 192, 194, 196, 198, 200) producing the spring
10 force is designed integrally connected to a tool hub (228, 230) of the application
11 tool (186, 188).

12

13 8. Tool receiver for a grinder according to claim 7, characterized in that at
14 least one recess (236) is provided in a component (234) of the carrier device
15 (184) forming a bearing surface (232) for the application tool (188), into which a
16 part of the tool hub (230) is elastically pressed in an operating position of the
17 application tool (188).

18

19 9. Tool receiver for a grinder according to claim 7, characterized in that the
20 slot (214, 216, 218, 220, 222, 224) is provided in the tool hub (228, 230) of the
21 application tool (186, 188), and at least one detent element (190, 192, 194, 196,
22 198, 200) is formed by a part of the tool hub (228, 230) in the vicinity of the slot
23 (214, 216, 218, 220, 222, 224).

24

25 10. Tool receiver for a grinder according to claim 9, characterized in that the
26 slot (220, 222, 224) comprises a wide area (238, 240, 242) and at least one
27 narrow area in front of an end position (250, 252, 254) of the carrier element
28 (208, 210, 212) that forms the detent element (196, 198, 200).

29

Cal
and

30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

1 11. Tool receiver for a grinder according to claim 1, characterized in that at
2 least one detent element (24, 26, 302) is supported in a fashion that allows it to
3 move against a spring element (20, 22, 312).
4

5 12. Tool receiver for a grinder according to claim 11, characterized in that the
6 detent element (24, 26, 302) can be released from its locked position using a
7 release button (28, 30).
8

Al
ant
9 13. Tool receiver for a grinder according to claim 11, characterized in that the
10 application tool (18) is connected to the carrier device (12, 14, 300) in the
11 circumferential direction (34, 36) via at least a first element (24, 302) and, in the
12 axial direction (38), via at least a second element (40, 42, 306).
13

14 14. Tool receiver for a grinder according to claim 1, characterized in that at
15 least one detent element (302) is integrally moulded on a discoid component
16 (304).
17

18 15. Tool receiver for a grinder according to claim 1, characterized in that at
19 least two elements (306) for immobilizing the application tool in the axial direction
20 (38) are integrally moulded to a discoid component (308).
21

22 16. Tool receiver for a grinder, in particular an angle grinder (10), that can be
23 connected to a tool hub (52, 94, 228, 230) via a carrier device (12, 14, 16, 182,
24 184, 300) of a tool receiver for a grinder with a drive shaft (54) of a grinder (10),
25 characterized in that the tool hub (52, 94, 228, 230) can be effectively connected
26 to the carrier device (12, 14, 16, 182, 184, 300) via at least one detent element
27 (24, 26, 190, 192, 194, 196, 198, 200, 302) that can be moved against a spring
28 force, that snaps into place in an operating position of the tool hub (52, 94, 228,
29 230) and immobilizes the tool hub (52, 94, 228, 230) with positive engagement.

1 17. Tool receiver for a grinder according to claim 16, characterized in that at
2 least one detent element (190, 192, 194, 196, 198, 200) is formed at least
3 partially by the tool hub (228, 230).

4
5 18. Tool receiver for a grinder according to claim 17, characterized in that at
6 least one slot (220, 222, 224) is provided in the tool hub (230) that comprises a
7 wide area (238, 240, 242) and at least one narrow area forming the detent
8 element (196, 198, 200).

11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100